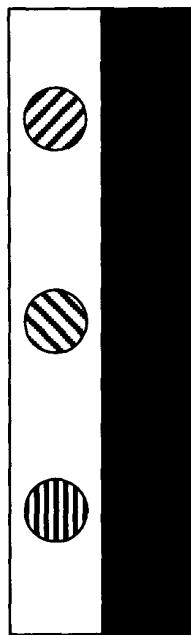


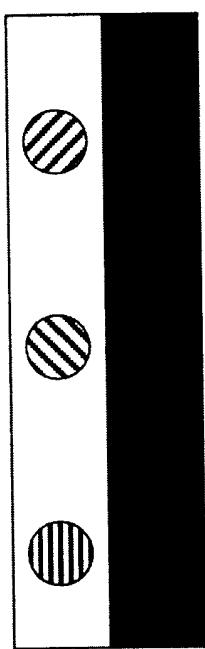
Prior Art 1



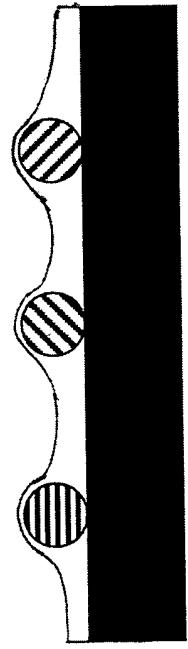
Fluid layer containing micro-spheres, gelling agent and chemical cross-linking agent spread over surface.

Figure 1b

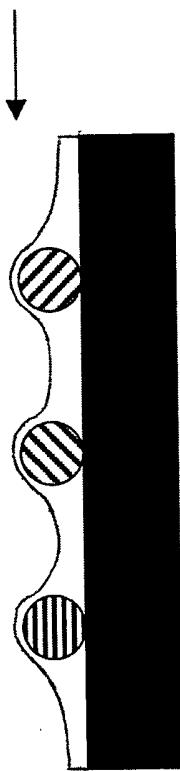
Gelling agent
undergoes physical
gelation
Figure 1c



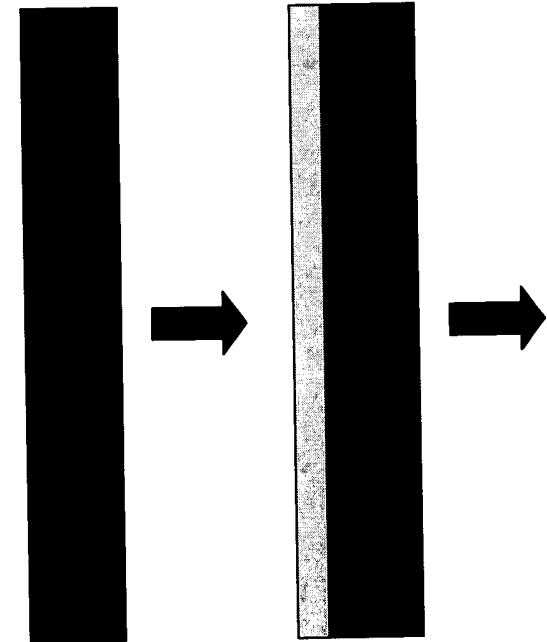
Water evaporated
from bead layer
Figure 1d



Cross-linking
reaction goes to
completion to
permanently fix
beads in the array
Figure 1e.



Prior Art 2

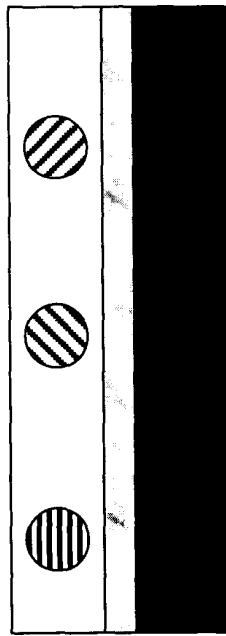


Surface
Figure 2a

Fluid layer containing
gelling agent and
slow-acting chemical
cross-linking agent
spread over surface.

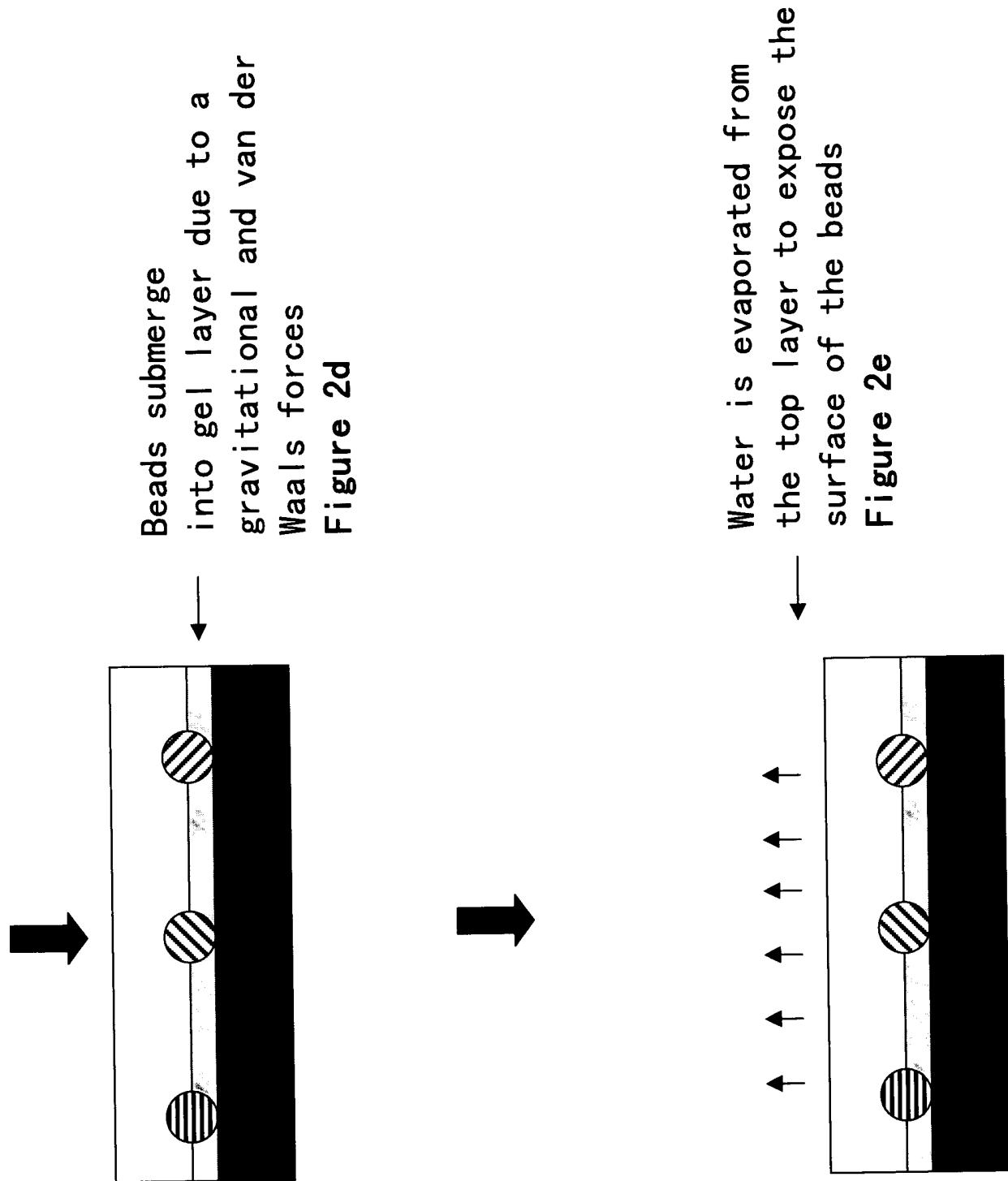
Figure 2b

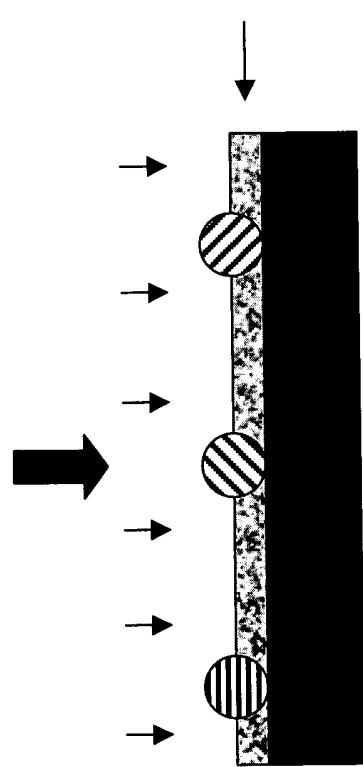
Dissolution and
re-deposition of polymer
on bead surface



Aqueous bead layer applied
on top of un-cross-linked
fluid gel layer

Figure 2c





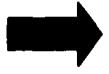
Chemical cross-linking reaction
allowed to go to completion in
order to permanently fix the beads

Figure 2f

Invention 1



Surface
Figure 3a



Fluid layer containing
gelling agent and slow-acting
chemical cross-linking agent
spread over surface.



Figure 3b

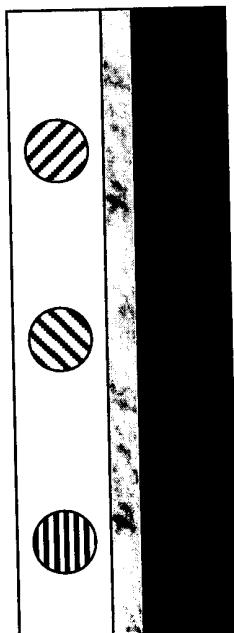


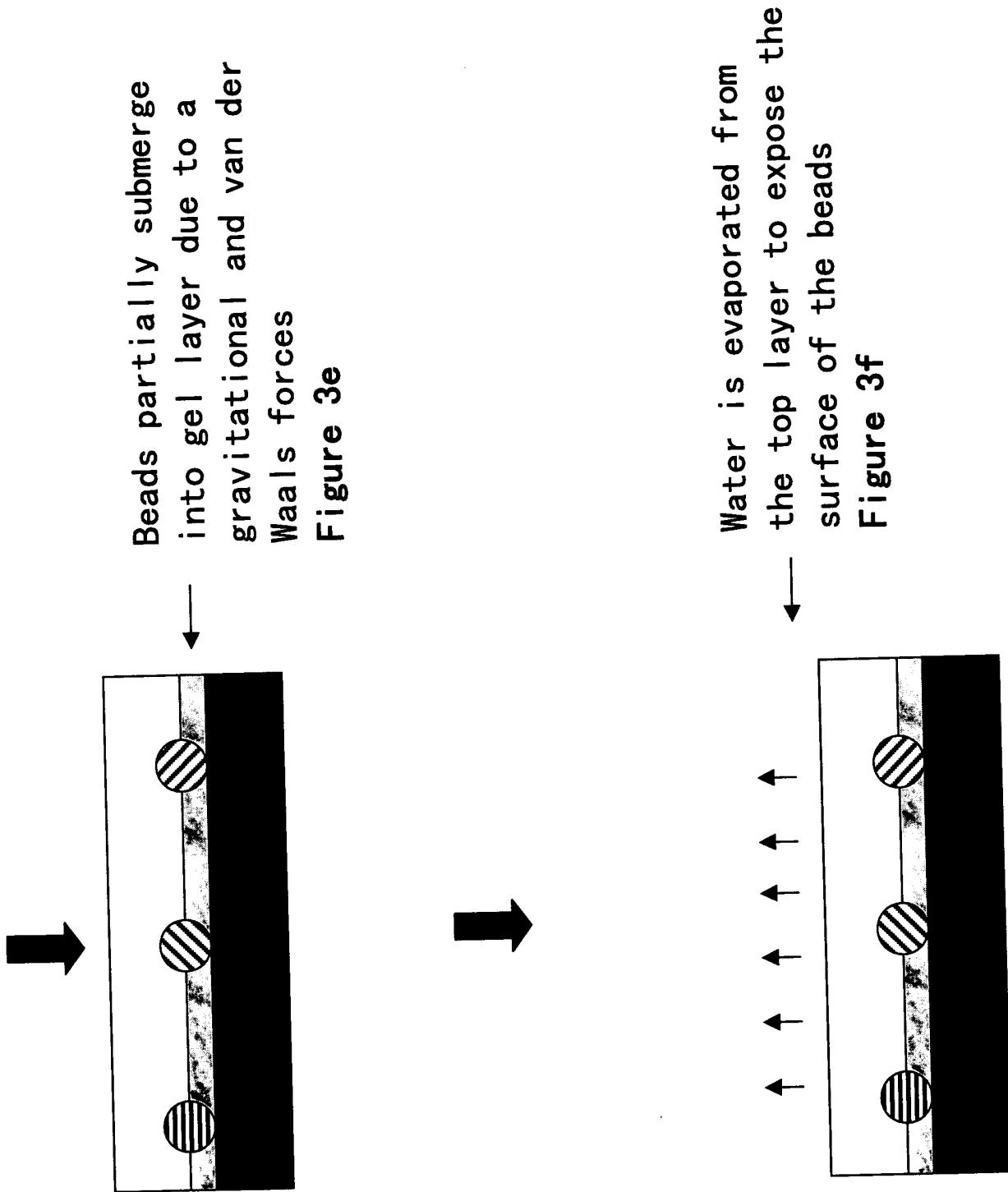
Gelling agent undergoes physical
gelation. Cross-link density
and elastic modulus adjusted to per
indentation by micro-spheres.

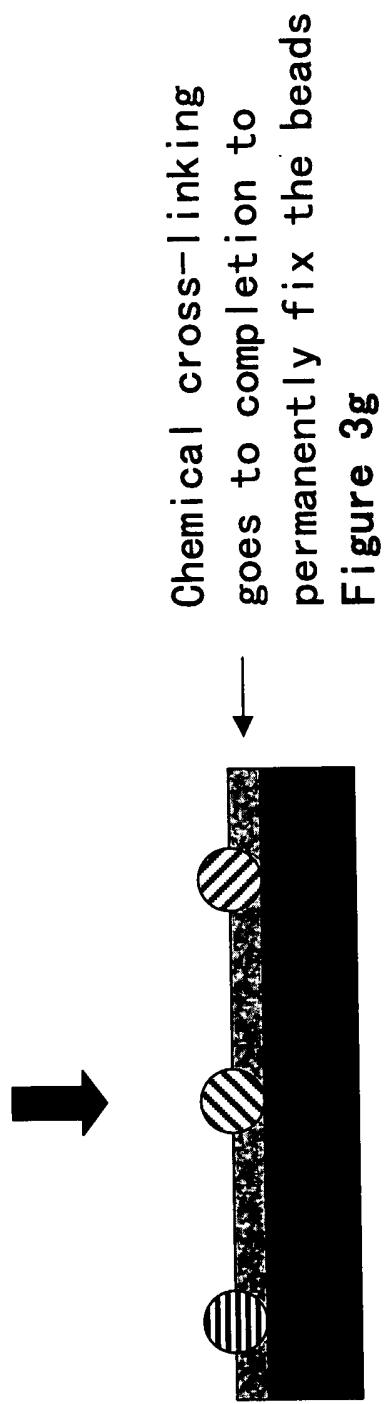


Figure 3c

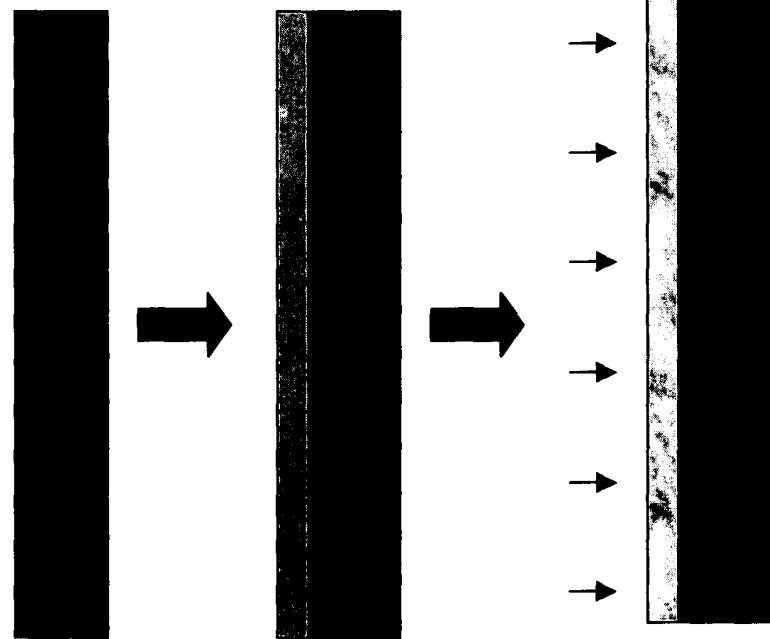
Aqueous bead layer applied
on top of gel layer
Figure 3d







Invention 2



Surface

Figure 4a

Fluid layer containing

gelling agent spread over surface.

Figure 4b

Gelling agent undergoes

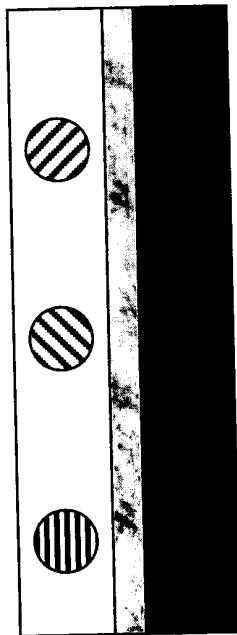
gelation by UV irradiation.

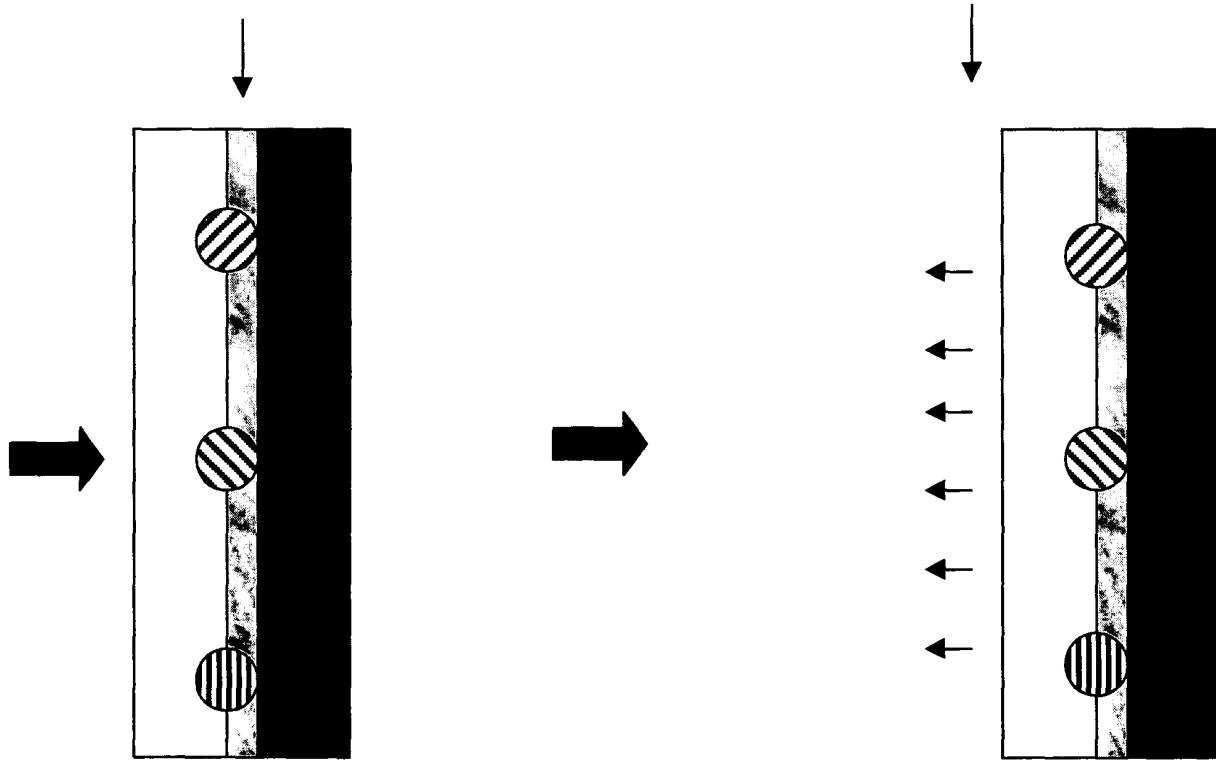
Cross-link density and elastic modulus adjusted to permit indentation by micro-spheres.

Figure 4c

Aqueous bead layer applied
on top of gel layer

Figure 4d



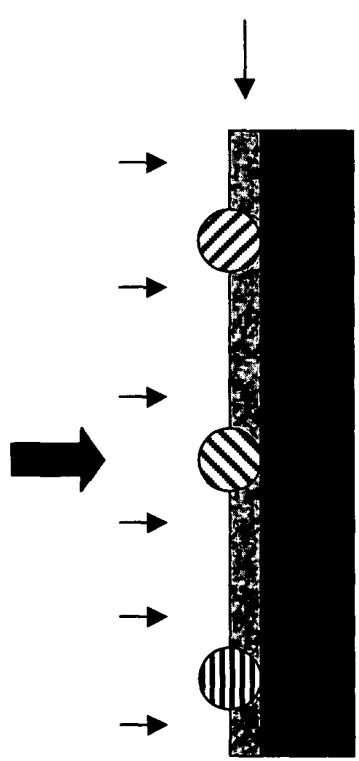


Beads partially submerge into gel layer due to a gravitational and van der Waals forces

Figure 4e

Water is evaporated from the top layer to expose the surface of the beads

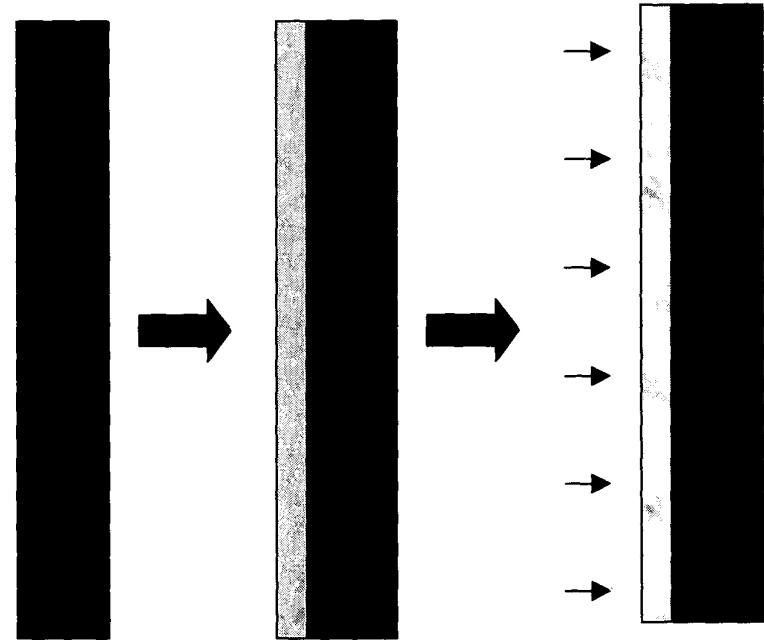
Figure 4f



Additional UV irradiation to
increase cross-link density in
order to permanently fix the beads

Figure 4g

Invention 3



Surface
Figure 5a

Fluid containing
gelling agent and a slow
acting chemical cross-linking
agent for the gelling agent is
spread over surface
to form receiving layer.

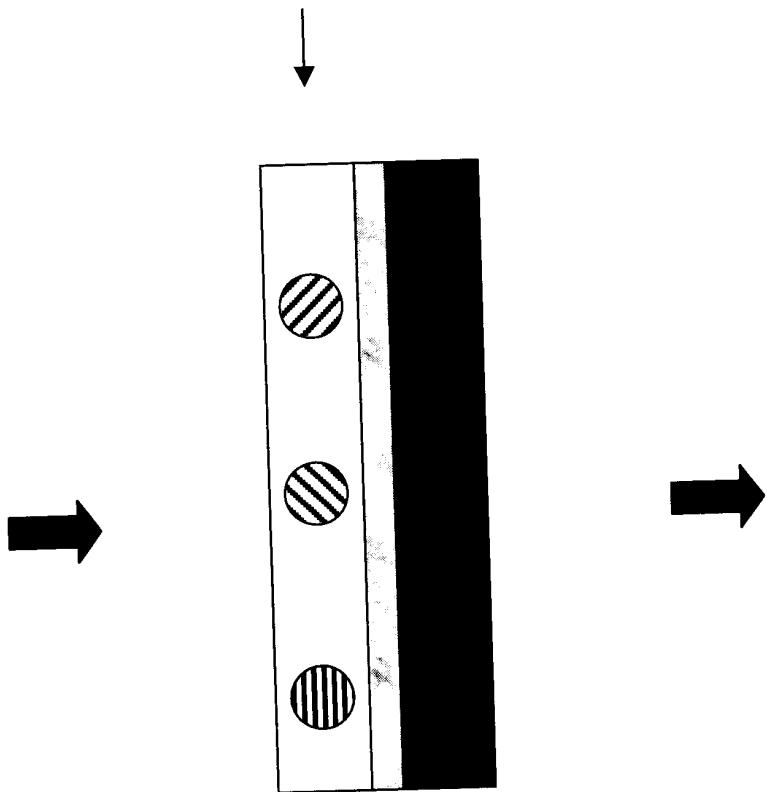
Figure 5b

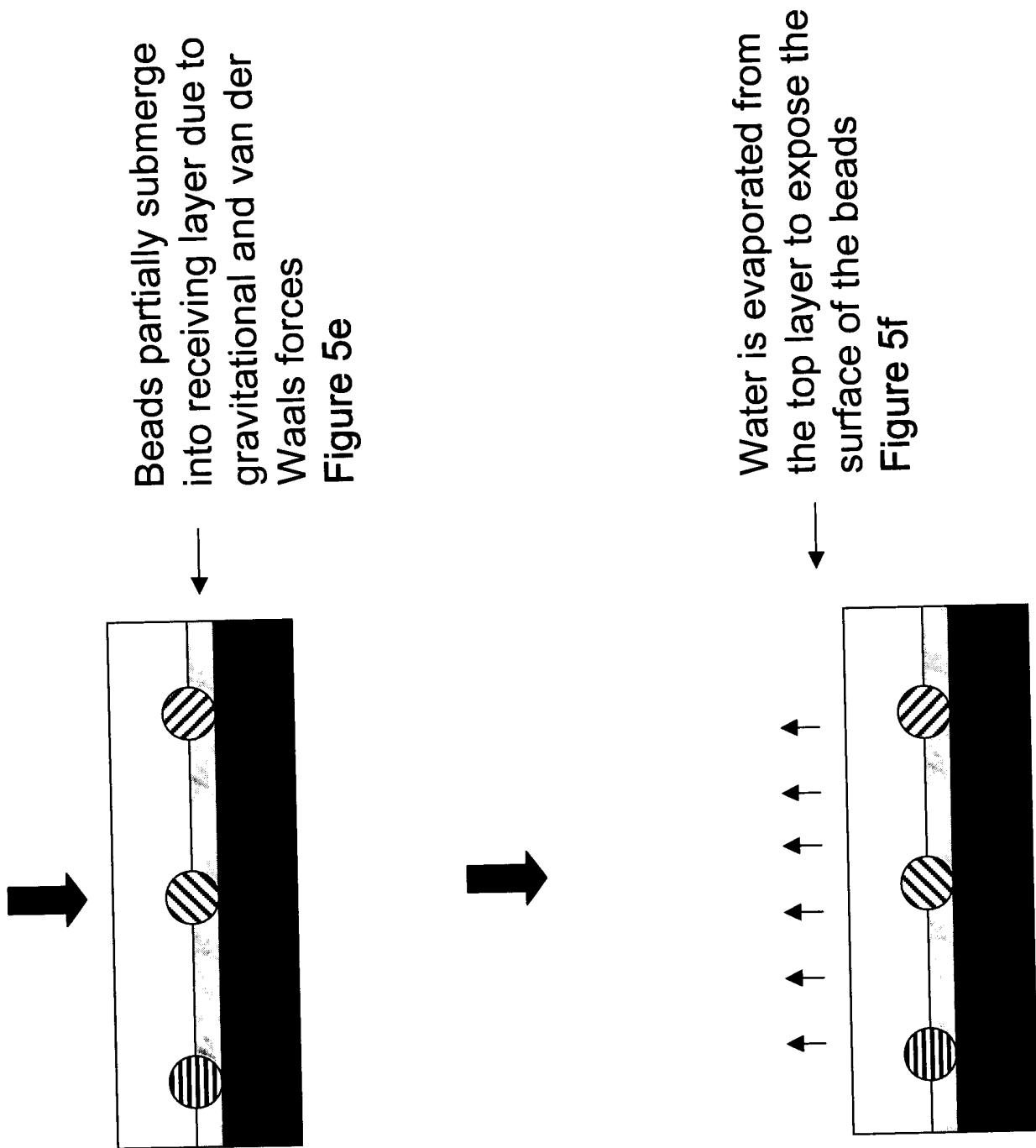
Gelling agent undergoes sol-gel
transition.
Elastic modulus
adjusted to permit
indentation by micro-spheres.

Figure 5c

Aqueous bead layer at a temperature lower than the sol-gel transition temperature of the gelling agent is applied on top of cross-linked receiving layer.

Figure 5d





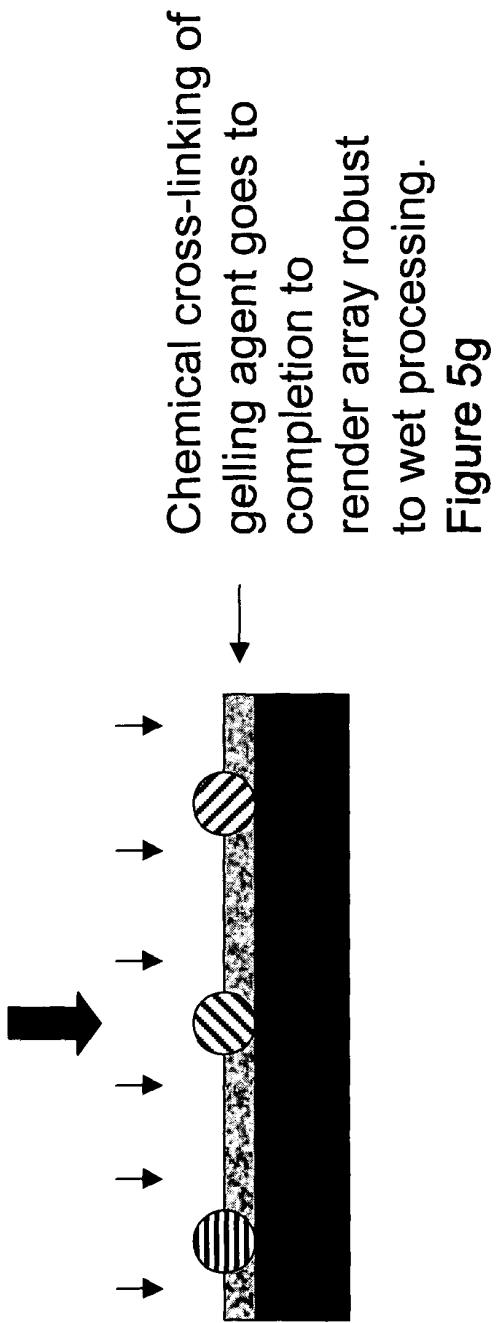
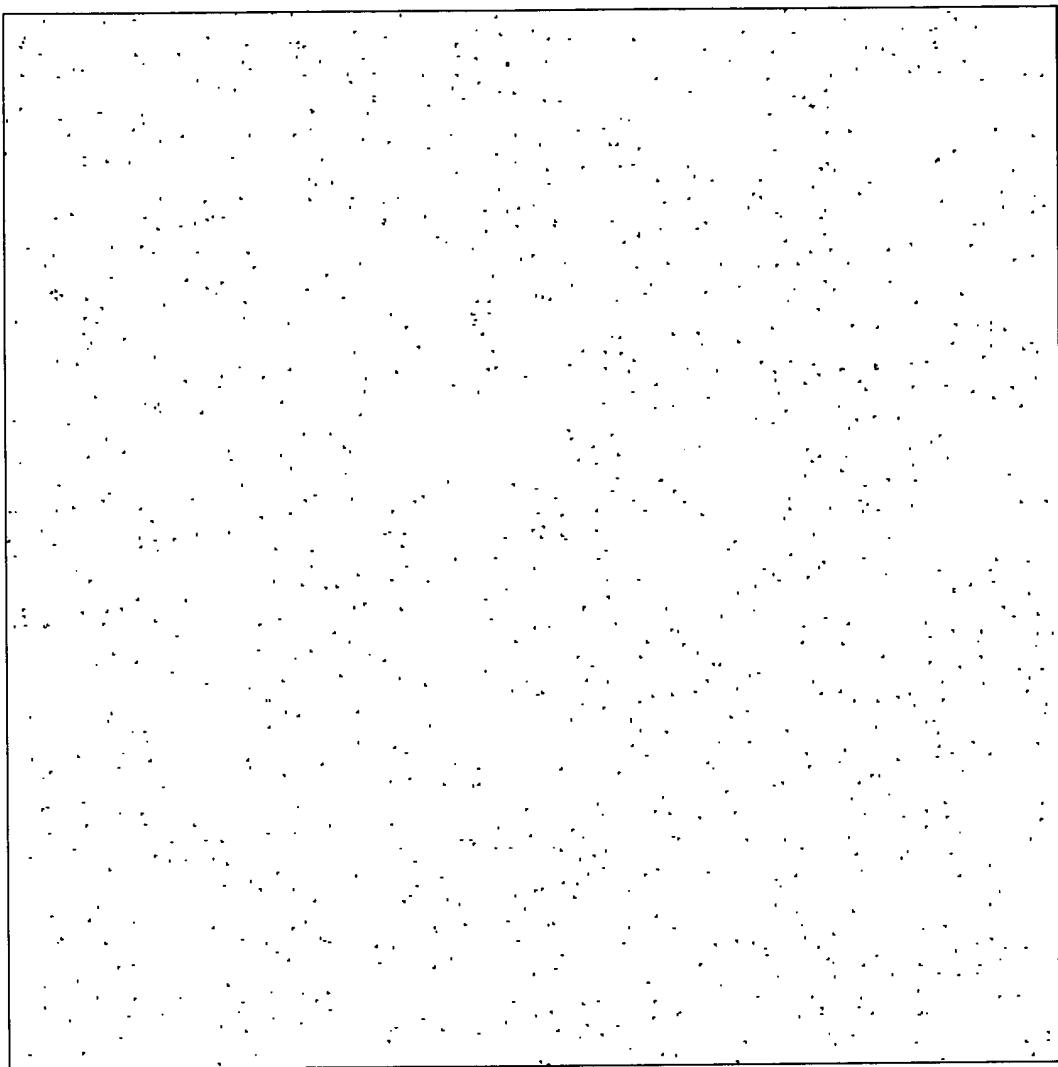


Fig. 6



no. of beads = 1000/sq.cm; particle dia = 10 microns

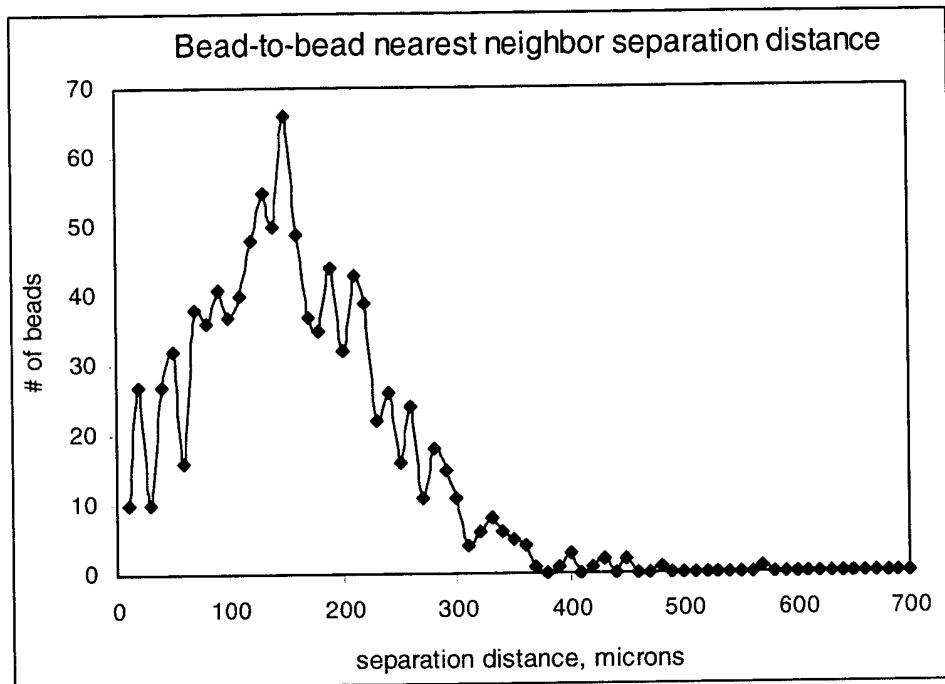


Fig. 7

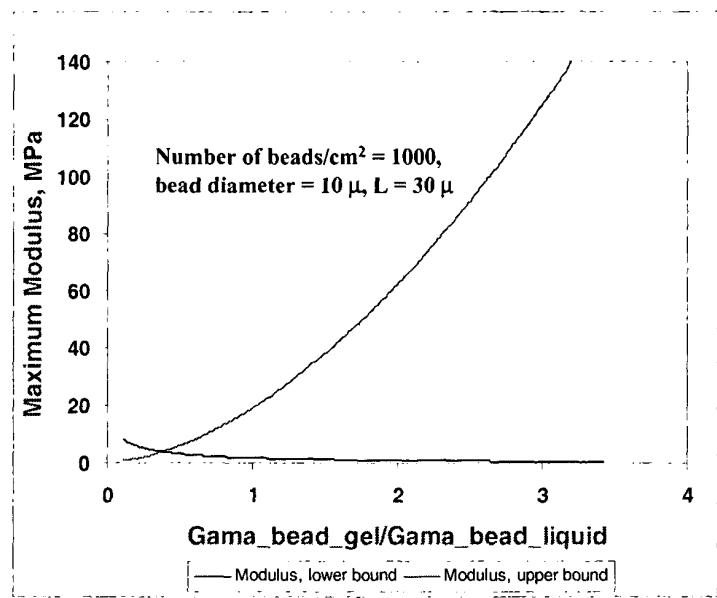


Figure 8. The lower and upper bounds of the feasible modulus is determined from the lower and upper curves.

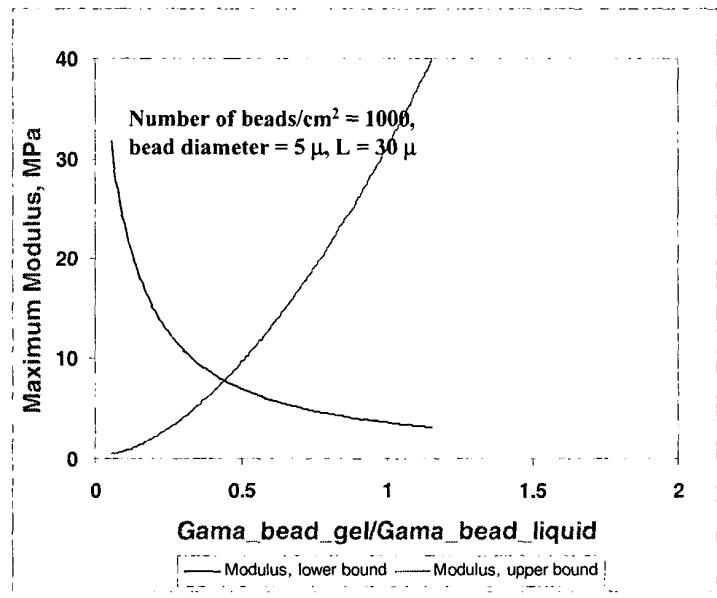


Figure 9. The lower and upper bounds of the feasible modulus is determined from the lower and upper curves.

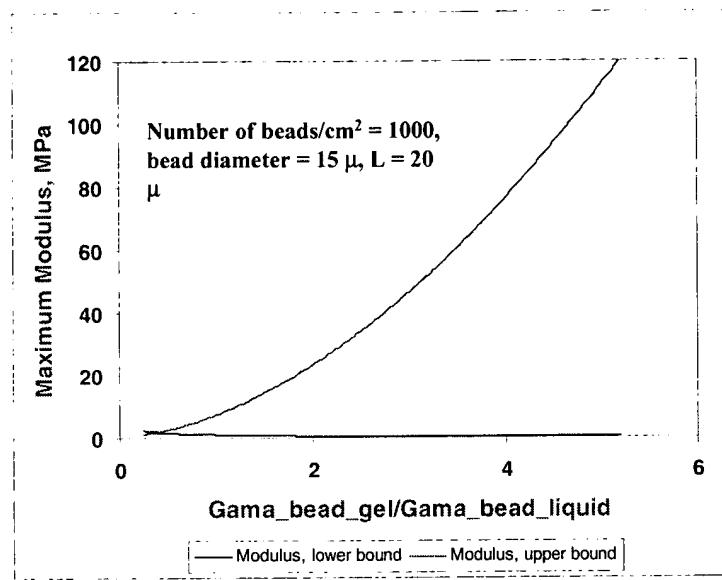


Figure 10. The lower and upper bounds of the feasible modulus is determined from the lower and upper curves.

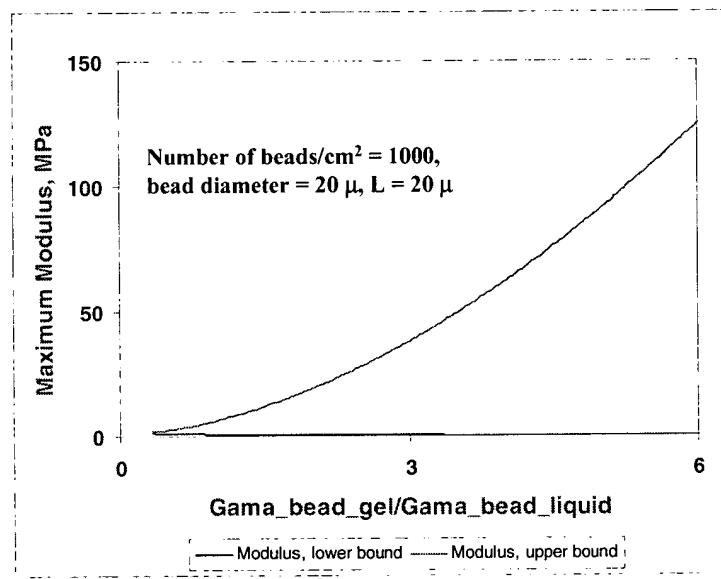


Figure 11. The lower and upper bounds of the feasible modulus is determined from the lower and upper curves.

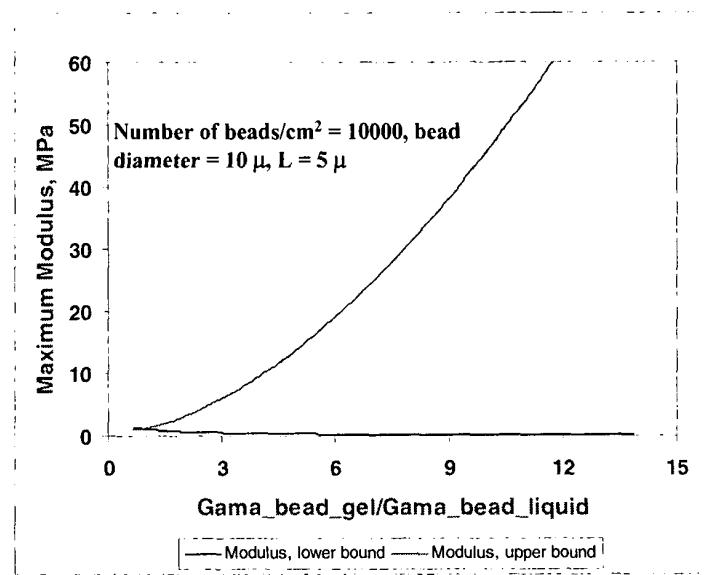


Figure 12. The lower and upper bounds of the feasible modulus is determined from the lower and upper curves.

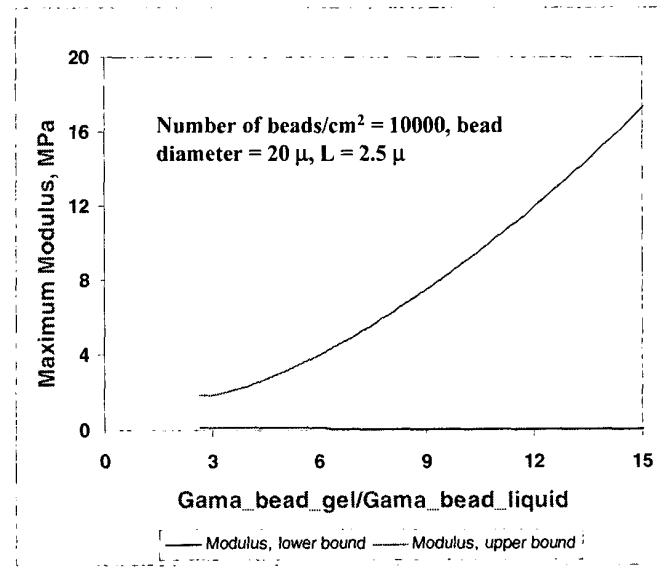


Figure 13. The lower and upper bounds of the feasible modulus is determined from the lower and upper curves.